

M. KRANTZ intends to imitate on a smaller scale the great Hell Gate explosion by opening in a similar manner the ground of the Champ de Mars, and thus expediting the excavations for the erection of the basement of the Exhibition building.

THE French papers give some figures with reference to the iron framework of the building now constructing. The weight required for the machine gallery will be 17,000 tons, and for other galleries 10,000 tons. To these 27,000 tons of iron or cast-iron may be added 700 tons of sheet iron for covering the building. The superficial extent of carpenter work for battening the roof will be 90,000 square yards covered with zinc. The quantity of the wood necessary is about 2,000 cubic yards. The number of rivets used for bolting the metallic frame will be 11,000,000, and the number of holes to be perforated a little more than double, viz., 23,000,000.

AMONG the lectures to be given at the Nottingham Literary and Philosophical Society during the coming winter, are one by Dr. Ball, F.R.S., November 9, "A Night at Lord Rosse's Telescope," and another on December 7, by Dr. M. Foster, F.R.S., "On Nerves."

THE following are some of the scientific works to be published during the coming season:—The second series of Mr. George Henry Lewes' "Problems of Life and Mind," entitled "The Physical Basis of Mind," is in the press, and will be published by Messrs. Trübner. The same publishers are preparing for publication in December, "Theoretical Mechanics," a Manual of the Mechanics of Engineering and of the Construction of Machines, with an Introduction to the Calculus; designed as a text-book for technical schools and colleges, and for the use of engineers, architects, &c., by Julius Weisbach, Ph.D., Professor at the Royal Mining Academy at Freiberg. It is translated from the fourth augmented and improved German edition by Eckley B. Coxe, A.M., Mining Engineer. With woodcuts.—Messrs. Bentley and Son have in the press a narrative of travel in Norway and Lapland, by Mr. S. H. Eden, to be called "Within the Arctic Circle."—We are glad to notice that Messrs. Chatto and Windus are preparing a new edition of "Wilson's American Ornithology; or, Natural History of the Birds of the United States;" with the continuation by Prince Charles Lucien Bonaparte; completed by the insertion of above one hundred birds omitted in the original work, and illustrated by notes and a life of the author by Sir William Jardine.—Among Messrs. H. S. King and Co.'s announcements we observe:—"The Large and Small Game of Bengal and the North-Western Provinces of India," by Capt. J. H. Baldwin, F.Z.S., Bengal Staff Corps, with numerous Illustrations. "Studies in Spectrum Analysis," by J. Norman Lockyer, F.R.S., "The Races of Man and their Geographical Distribution," from the German of Oscar Peschel. This last-named book is ready.—Prof. Tyndall's "Lessons in Electricity at the Royal Institution," will be published by Messrs. Longmans at the end of this month.

THE additions to the Zoological Society's Gardens during the past week include two Silky Marmosets (*Hapale chrysoleucus*) from S.E. Brazil, presented by Master T. A. Brassey; a Green Monkey (*Cercopithecus callitrichus*) from W. Africa, presented by Mr. Chas. L. N. Ingram; an Entellus Monkey (*Semnopithecus entellus*) from India, presented by Mr. Edwin Penn; two Coatis (*Nasua nasica*) from S. America, presented by Mr. J. A. Watson; a Vulpine Phalanger (*Phalangista vulpina*) from Australia, presented by Mr. Graham M. Sutton; four European Terrapins (*Clemmys europea*), European, presented by Mr. Edward W. Bonham; two Tora Antelopes (*Alcelaphus tora*) from S. Africa, purchased; two Soemmerring's Antelopes (*Gazella soemmerringi*) from S. Africa, deposited; a Crested Pigeon (*Ocyphaps lophotes*), bred in the Gardens.

SCIENTIFIC SERIALS

Poggendorff's *Annalen der Physik und Chemie*, No. 8, 1876. —This interesting number commences with a paper by M. Zöllner, investigating a class of electrical phenomena that do not appear to have been previously studied. When two different bodies, an insulator and a half-conducting rubbing instrument are rubbed together, electrical currents occur in the rubber, as follows:—If the rubbed insulator be positively electric, the currents at the surface of contact or in the interior of the rubber are parallel, but opposite to the relative motion of the insulator; if the latter be negative, the currents of the rubber are parallel, and in the same direction as the insulator's motion. These currents were measured, and shown to be often very considerable, and they could be intensified by multiplying the rubbers and connecting their corresponding parts with wires. They lessen the useful effect of an electric machine, and an advantage is had by uniting the electricity at the positive end of the rubber with the positive electricity of the conductor. M. Zöllner is led to study a variety of related experiments, e.g. the currents generated in flow of water through a thin tube. He arrives at this general result: Diaphragm-currents and their modifications are due to the occurrence of new electromotive forces, such that the electric current they generate in the moved liquid, so long as it is in contact with the canals of the diaphragm or the capillary tube, are always opposite to an electric current which would force the liquid in the same direction through the diaphragm as the mechanical pressure.—From experiments made with caoutchouc, carbonic acid, and hydrogen, on the diffusion of gases through absorbing substances, M. Wroblewski concludes that the velocity with which a given quantity of gas diffuses through a caoutchouc membrane is proportional to the pressure of the diffusing gas on the membrane.—A paper on the radiometer is contributed by M. Finkener; the object of the experiments was to show the influence of change of gas, pressure, and radiant heat on the instrument. He finds (1) that with rarefaction not carried too far, and with equal heating, a given motion takes place at a greater pressure in a specifically lighter gas than in a heavier one; (2) the turning force excited by the flame increases at first (other circumstances the same) with the rarefaction of the gas, but with further rarefaction decreases; (3) this maximum occurs at a greater pressure with hydrogen than with air and carbonic acid. M. Finkener offers an explanation of the motion, deduced from these phenomena.—The law of colour-mixture may be studied by superposing different parts of two spectra, or looking at a glass plate from which a surface of one colour is reflected while another colour is seen through it, or by means of the persistence of impressions from a disc with variously coloured sectors or rings set in rapid rotation. M. Bezold here gives another and still more convenient method. You look through a prism of Iceland spar set in a tube blackened interiorly, which is closed below by a disc with four squares cut out of it. The prism gives double images of the squares, and in a certain position two of the eight are brought to coincide with other two in the middle. Surfaces of different colours being brought under the two squares occupying (say) the upper row, their composite colour is obtained in the middle image, and then may be found what colour must be put under the lower two squares to obtain a colour in the middle corresponding to the one above.—Dr. Berthold collects some interesting early indications of a knowledge of the phenomenon of fluorescence as shown by an infusion of nephritic wood. It is remarkable that though Priestley, Fischer, and Wilde referred at some length to the observations made by Kircher, Boyle, Newton, Wolff, and Wunsch, on fluorescence, the facts should have been almost entirely forgotten till our time.—Studying the influence of temperature on the galvanic conductivity of tellurium, M. Exner finds that the seemingly quite irregular resistances of the metal after repeated heatings stand in direct relation to the time of heating and of cooling, a circumstance which must be connected with the crystalline structure of tellurium at low temperatures.—Among the remaining papers we note accounts of an apparatus for combination of vibrations at right angles to each other (Stöhrer), a new hydrometer (Sedlacek), and an improved poison syphon (Antolik).

Sitzungsberichte der naturwissenschaftlichen Gesellschaft Isis in Dresden, January to June, 1876.—From this publication we note the following papers of importance:—*Mineralogical and Geological Section*.—Geognostical researches on the Leitmeritz mountains, by Herr Engelhardt.—On the Velino fall near Terni, by C. Bley.—On the silver and gold mines in the neighbourhood

of Nertschinsk, by Herr von Pischke.—On the coal formation in the Plauen district, by Dr. Geinitz.—*Section for Researches on Prehistoric Times*.—On the sepulchral mounds (dolmen) of Denmark, by Herr Jünger.—On some objects found recently in former Lake dwellings, by Herr Geinitz.—On the burying-places of Auvernier on the Neufchatel lake, by Prof. Desor.—On the composition of some mortars and face powders of the ancients, by Dr. Landerer.—On some tablets with interesting inscriptions recently found at Pompeii, by Sig. Fiorelli.—On the occurrence of artificially pointed sticks of wood in a layer of argillaceous coal in Switzerland, by Prof. Ecker.—Report of the last meeting of the German Anthropological Society at Munich, and remarks on the same, by Major Schuster.—*Zoological Section*.—On the season dimorphism of certain day lepidoptera, by Herr von Kiesenwetter.—On anthropoid monkeys, by Dr. A. B. Meyer.—On the metamorphosis of the Mexican axolotl, by Dr. B. Vetter.—*Physical and Chemical Section*.—On an improved influence electrical machine, by Carl Dathe.—On a new galvanometer, by Schadowell in Dresden, and on a new Geisler radiometer, by Prof. Neubert.—On the action of chloride of lime upon carbon compounds.—*Mathematical Section*.—On ray-complexes of the second degree, by Dr. Burmester.—On methods of projection, by the same.—On the problem to determine two curves, by Dr. Heger.—On the mechanical conception of chemical processes, by Dr. Hoffmann.—On Riemann's planes, by Dr. Koenigsberger.—On the composition of forces in space, by Herr Mohr.—*Botanical Section*.—On cotton at Pompeii and on some Italian botanical gardens, by Carl Bley.—On some new garden and house plants, by G. A. Petzold.—*General Meetings*.—On excavations and discoveries near Halle, by Dr. Caro.—On the Colorado beetle, by Herr von Kiesenwetter.—On the intellectual life of insects, by the same.—On the axioms of mathematics, by Dr. Koenigsberger.—On researches made in the Caucasus Mountains on earth wax, petroleum, and mud volcanoes, by Dr. Schneider.

Zeitschrift für Wissenschaftliche Zoologie, vol. xxvii, Part 1.—R. Wiedersheim, of Würzburg, devotes a long paper to an account of the structure, disposition, and secretion of the cephalic skin-glands in the tailed amphibia. They appear to possess very generalised characters, and the author regards them as representing the more specialised Meibomian, Harderian, and other glands of higher animals. He claims to have demonstrated the connection of many of his gland-cells with nerve-fibrils, and with branches of ganglion-cells.—August Weissmann has an elaborate contribution on the Daphnidæ, dealing with the formation of the winter eggs in *Leptodora hyalina*. He describes at length the origin of the winter egg, which at first contains several large nutritive cells destined to have all their contents absorbed by one cell to form the nutritive mass for the young germ. Many interesting details are given; but if everything were written at such length, only Germans would survive.—Dr. William Marshall, of Weimar, who has published valuable researches on the Hexactinellid Sponges, has an article on their classification and relationships. His systematic revision of the genera and species will be very useful. He considers the sponges with four-rayed spicules to have been derived from the Hexactinellids, and finds no sharp distinction between the latter and the Ventriculitidæ.—Franz Vejdovsky, of Prague gives an account of the anatomy of *Tubifex umbellifer* (Ray Lankester), for which he creates a new genus, *Psammoryctes*. This interesting fresh-water oligochaetous annelid has been found in Lake Onega, in Victoria Docks, in the Paris Jardin des Plantes, and in Bohemian lakes.

THE sixth part of Reichert and Du Bois Reymond's *Archiv* for 1875 (issued as late as May last) opens with the conclusion of Du Bois Reymond's second memoir on the negative variation of the muscle-current during contraction; it must necessarily be read by all students of this abstruse subject.—R. Hartmann continues his lengthy contributions to our knowledge of the anthropoid apes, by describing several skulls of chimpanzees.—The remaining papers do not call for notice in these columns.—Part 1 for 1876 contains an interesting account, by F. Kurtz, of the minute anatomy of the leaf of *Dionaea muscipula*, accompanied by two plates.—A very long paper by Hermann Munk follows, in this and the following part, on the electrical and motor phenomena of the leaf of *Dionaea muscipula*. The views of Dr. Burdon Sanderson and Prof. Hermann are controverted in many respects; it being contended that the resemblance between the contraction of muscle and that of the leaf is far less complete than the former observer has asserted.—Parts 1 and 2 contain further contribu-

tions by Du Bois Reymond on the negative variation of the muscle-current.—Prof. W. Krause maintains his account of the allantois in the human embryo against Kölliker's denial of its existence in his recent work on Development.—Dr. Grüber gives some more notes of minor anatomical variations in the second part, and Dr. Adamkiewicz commences a further contribution on animal heat, which promises to be of great interest.

No. 32 of the *Journal* of the Quekett Club contains the following papers:—On the principle of illumination in connection with Polarisation, by Mr. W. K. Bridgman; On a new method of mounting microscopical objects, by Prof. H. L. Smith; On a new process of histological staining, by Dr. Francis E. Hoggan; On *Tubicolaria Najas*, by Mr. J. Fullagar; the address of the President, Dr. Matthews, and the Eleventh Annual Report.

SOCIETIES AND ACADEMIES

LONDON

Royal Microscopical Society, October 4.—Mr. H. C. Sorby, president, in the chair.—A paper was read by Mr. Thos. Palmer on a new method of measuring and recording bands in spectra, consisting of a photographed micrometer scale shown in contact with the spectra in the field of view and so arranged as to be capable of adjustment as required. The values indicated by the micrometer were by means of a chart and tables engraved and prepared by the author, easily converted into wave-length measurements.—A paper on the microscopical structure of amber, by Mr. H. C. Sorby and Mr. P. J. Butler, was read by the president.—A paper by Dr. Hinds on a curious effect in connection with the cells in the leaves of *Hypericum Androsæmum* was (owing to the lateness of the hour) taken as read.

PARIS

Academy of Sciences, Sept. 25.—Vice-Admiral Paris in the chair. The following papers were read:—Examination of observations presented at various epochs regarding the transits of an intra-Mercurial planet (continued), by M. Leverrier. He notices fourteen observations from 1820 to the present.—Probable consequences of the mechanical theory of heat, by Gen. Favé. The heat from the sun may have a repellent action on the stars. The phenomena of latent heat may probably be explained by supposing that a liquid contains a greater quantity of interposed ether than a solid, and a gas more than a liquid. Tempered steel probably owes its elastic property to an increase of ether. Ozone and oxygen, sulphur and phosphorus, in their different states, perhaps obey the same law. Opaque solid bodies, as well as transparent bodies, have a certain quantity of constituent ether which increases with the temperature.—On the contact of a curve with a system of curves doubly infinite, by Mr. Spottiswoode.—Photomicrographic researches on the effects of reduction of salts of silver in photographic negatives, by M. Girard. Examining with high power a negative developed indistinctly with sulphate of iron or pyrogallol acid, there are found in the clear unimpressed parts, crystals of reduced iodide of silver uniformly distributed; these constitute the *veil*, a cause of frequent success.—The carburetted schists of Côtes-du-Nord, by M. Hena.—On the destruction of phylloxera by intercalary cultivation of red maize, by M. Gachez. The insect abandons the vine to attack the roots of the maize.—On the use of bob-bins of very small resistance in employment of telegraph lines for meteorological announcements in stormy weather, by M. Germain.—On the number of branches of curves of a system (μ, ν), which cut a given algebraic curve at an angle of given magnitude, or the bisectrices of which have a given direction, by M. Fouret.—New process of extraction of gallium, by M. Lecoq de Boisbaudran. The gelatinous precipitate given by zinc in the acid solution of the natural mineral is dissolved in hydrochloric acid and treated with sulphuretted hydrogen. Carbonate of soda added in portions to the filtered liquid, enables the oxides with which the gallium is associated to be isolated. These transformed into sulphates, leave in hot water the sub-salt of gallium when the oxide of this metal is precipitated by a prolonged current of carbonic acid. It has then only to be purified.

October 2.—Vice-Admiral Paris in the chair. The following papers were read:—Rectification of an error which mars theorems on systems of two or three segments, making a constant product, by M. Chasles.—Intra-Mercurial planets (continued), by M. Leverrier. He analyses the observations given. We possess data for a first theory which will make it possible to find the planet easily,